

We Claim:

1. A method of detection of a run-flat condition of a vehicle tire, said tire being mounted
2 on a wheel, wherein:

- 3 - a quantity $f(\alpha, t)$ is sensed, which varies with the angular displacement of the wheel in time;
4 - measuring signals are developed from that quantity, which vary with the angular speed of the
5 wheel $d\alpha(t)/dt$;
6 - a quantity characteristic of the dispersion of measuring signals is calculated;
7 - an alarm is set off when the characteristic quantity satisfies a given ratio.

1 2. A method of detection according to Claim 1, in which said characteristic quantity is the
value of the standard deviation of said measuring signals.

1 2. A method of detection according to Claim 1, in which, in order to calculate the
characteristic quantity of dispersion of the measuring signals:

- 3 - the rotation frequency of the wheel is determined;
4 - the energy of the measuring signals is calculated in at least one narrow frequency band centered
5 on one of the first harmonics of said rotation frequency; and
6 - an alarm is set off when said energy satisfies a given ratio.

1 4. A method of detection according to Claim 3, in which the rotation frequency of the

1 wheel is determined from said measuring signals.

2 5. A method of detection according to Claim 3, in which the energy of said measuring
3 signals is calculated in at least two narrow frequency bands, each centered on one of the first
4 harmonics of the rotation frequency of said wheel, with the exception of the first harmonic.

1 6. A method of detection according to Claim 3, in which, after having detected that the
2 sum of the energies of the measuring signals in at least two narrow frequency bands centered on one
3 of the first harmonics satisfies a given ratio, the energy of the measuring signals is compared in each
4 of said frequency bands to a given corresponding threshold and an alarm is set off when, for at least
5 two of said frequency bands, the energy of the signals is higher than said corresponding threshold.

1 7. A method according to Claim 3, including comparing the energy or energies of the
2 measuring signals of the wheel of said tire with the energy or energies of the measuring signals of at
3 least one of the other tires of the vehicle and an alarm is set off when the result of the comparison
4 satisfies a given ratio.

1 8. A method of detection according to Claim 3, in which measuring signals are
2 developed which vary with the angular acceleration of the wheel $d^2\alpha(t)/dt^2$.

1 9. A method of detection according to Claim 3, in which said narrow frequency band or
2 bands has a width less than or equal to 10 hertz.

1 10. A method of detection according to Claim 3, in which the energy of said measuring
2 signals is further calculated in at least a second frequency band, where the measuring signals are
3 substantially independent of the run-flat condition of said tire and no alarm is set off when the
4 measuring energy in said second frequency bands exceeds a given threshold.

1 11. A method of detection according to Claim 10, in which said second frequency bands
2 are situated outside the multiple frequencies of the rotation frequency of said wheel.

1 12. A method of detection according to Claim 1, in which no alarm is set off when the
2 speed of said vehicle is below a given threshold.

1 13. A method of detection according to Claim 1, in which the location of the tire in run-
2 flat condition is identified and transmitted to the driver of the vehicle.

1 14. A method of detection according to Claim 1, in which, a vehicle containing a wheel
2 antilock device, the measuring signals are developed from sensors of said wheel antilock device.

1 15. A system of detection of a run-flat condition of a vehicle tire, said tire being mounted
2 on a wheel, comprising:

- 3 - first means for sensing a quantity $f(\alpha, t)$ which varies with the angular displacement of the wheel
4 in time,
5 - second means for elaborating measuring signals from that quantity, which vary with the angular
6 speed of the wheel $d\alpha(t)/dt$, calculating a characteristic quantity of dispersion of the measuring
7 signals and setting off an alarm when said characteristic quantity satisfies a given ratio;
8 - third means for transmitting said alarm to the driver of the vehicle; and
9 - fourth means arranged in the mounted tire/wheel assembly to generate vibrating warning signals
10 on a run-flat condition of the tire.

1 16. A system according to Claim 15, in which said means for generating vibrating
2 warning signals generate at least one sinusoidal function, the period of which is a submultiple of a
3 turn of the wheel.

1 17. A system according to Claim 16, in which said means for generating vibrating
2 warning signals appreciably generate only one sinusoidal function, the period of which is a
3 submultiple of a turn of the wheel.

1 18. A system according to Claim 15, in which, a vehicle being equipped with a wheel

2 antilock device, the first and second means consist of the sensors and computer of said wheel
3 antilock device.

1 19. A safety insert intended to be radially mounted outside the rim of a wheel, said safety
2 insert containing on its radially outer surface axially oriented bars, characterized in that said bars
3 have sides whose inclination from normal to the tread in the longitudinal direction varies as a
4 function of azimuth.

1 20. A safety insert according to Claim 19, in which the longitudinal inclination of the bars
2 as a function of azimuth is at least a sinusoidal function whose period is a submultiple of the turn
3 of the insert.

1 21. A tire intended to equip a wheel, said tire containing a tread, two sidewalls and two
2 beads as well as support elements intended to support the tread in case of run-flat condition,
3 characterized in that said support elements contain means for generating rotation speed variations
4 on a run-flat condition of said tire.

1 22. A tire according to Claim 21, in which said means for generating rotation speed
2 variations of said wheel entail a variation as a function of azimuth of the radius under load of said
3 tire on running with a tire deflection above a given threshold.

4 23. A tire according to Claim 22, in which the variation as a function of azimuth of the
5 radius under load of said tire is at least a sinusoidal function, the period of which is a submultiple
6 of a turn of the insert.

1 24. A wheel intended to receive a tire, characterized in that it contains means for
2 generating rotation speed variations of said wheel on a run-flat condition of said tire.

1 25. A wheel according to Claim 24, in which said wheel presents a variation as a
2 function of azimuth of the radial height of at least one of its flanges.

1 26. A wheel according to Claim 25, in which said variation of radial height of at least
2 one of the flanges as a function of azimuth is obtained by the addition of an extra part at least
3 partially covering the radial end of said flange.

1 27. A wheel according to Claim 25, in which said variation of radial height of at least
2 one of the flanges as a function of azimuth is at least a sinusoidal function, the period of which is
3 a submultiple of a turn of the insert.